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High incidence of latent tuberculous infection among South African health workers: an urgent call for action

K. M. McCarthy,*†‡ L. E. Scott,§ N. Gous,§ M. Tellie,* W. D. F. Venter,* W. S. Stevens,§ A. Van Rie¶

*Wits Reproductive Health and HIV Research Unit, University of the Witwatersrand, Johannesburg, †The Aurum Institute, Parktown, Johannesburg, ‡School of Public Health, University of the Witwatersrand, Johannesburg, §Department of Molecular Diagnostics, National Health Laboratory Service and University of the Witwatersrand, Johannesburg, South Africa; ¶Infectious Diseases, Department of Epidemiology, University of North Carolina, Chapel Hill, North Carolina, USA

SUMMARY

SETTING: In South Africa, health care workers (HCWs) are at two-fold greater risk of acquiring tuberculosis (TB) disease than the general population. Few studies have evaluated the risk of incident tuberculous infection.

OBJECTIVE: To determine the incidence and risk factors for latent tuberculous infection (LTBI) among HCWs and to compare the results of the interferon-gamma release assay (IGRA) with those of the tuberculin skin test (TST).

DESIGN: HCWs, including medical students, underwent a TST and human immunodeficiency virus (HIV) and IGRA testing at baseline and 12 months, and IGRA at 6 months. The participants kept 12-month TB exposure logs.

RESULTS: Among 199 participants (150 [76%] females, median age 31 years [range 20–61]), incident LTBI was documented using IGRA in 25/97 (26%; incident rate 29 cases/100 person-years [py], 95%CI 20–44) and using TST in 25/93 (27%; incident rate 29 cases/100 py, 95%CI 19–42). Agreement between TST and IGRA was poor (44.8%, $\kappa = 0.23$). Higher annual exposure to TB cases was reported among persons with LTBI than in those who were persistently IGRA-negative (81 cases, 95%CI 61–102 vs. 50 cases, 95%CI 43–57, $P < 0.01$).

CONCLUSION: The high LTBI incidence and the association of incident LTBI with annual TB caseload among HCWs indicate that more effective TB infection control should be implemented in South African health care facilities.

KEY WORDS: IGRA; TST; TB infection control; occupational health

THE CO-EPIDEMICS OF TUBERCULOSIS (TB) and human immunodeficiency virus (HIV) infection in sub-Saharan Africa continue to challenge health care provision.[1] The high TB incidence in South Africa (860 per 100 000 population in 2013)[1–3] places health care workers (HCWs) at considerable risk of occupational TB. South African nurses may experience a TB incidence rate double that of the general population,[4,5] and a six-fold greater incidence rate of hospitalisation for multidrug-resistant TB.[6] In an occupational health programme providing TB and HIV services, 5% of community health workers were identified as having TB.[7]

Identification of HCWs who may benefit from chemoprophylaxis has traditionally been performed using the tuberculin skin test (TST) and, more recently, interferon-gamma release assays (IGRAs). In a systematic review, the annual risk of tuberculous infection, as measured by the TST, among HCWs in high TB burden countries ranged from 0.5% to 14%,[8] but this risk has not yet been well documented in sub-Saharan African HCWs.[8] Few studies have used IGRA responses to evaluate the burden and incidence of latent tuberculous infection (LTBI) among HCWs in high-burden countries.[9–11]

We performed serial IGRA and TSTs among a cohort of South African medical students and HCWs providing TB and HIV care to determine the 12-month LTBI risk, explore risk factors for LTBI acquisition, and compare longitudinal IGRA and TST patterns in this population.

METHODS

Study population and setting

HCWs providing TB and HIV care for in-patients and HIV clinic attendees at three public sector facilities in Johannesburg (staff size approximately 450) and medical students in their first year of full-time clinical studies (class size 296) were eligible for study participation, except if they were receiving anti-tuberculosis treatment or presented with TB symp-

Correspondence to: Kerrigan M McCarthy, Aurum Institute, Post Net Suite 300, Private Bag X30500, Houghton 2041, South Africa. Tel/Fax: (+27) 105 901 300. e-mail: KMcCarthy@auruminstitute.org

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toms at enrolment. At enrolment (January 2008), the South African Department of Health had just released their 'Draft National Infection Prevention and Control Policy for TB, MDR-TB and XDR-TB',[12] and neither the medical school nor the health facilities had specific policies regarding TB infection control, or occupational screening programmes for TB or LTBI.

Study procedures and data collection

Before enrolment, study details, risks and benefits were presented by the Dean for Student Affairs, facility managers, infection control nurses and investigators. Persons agreeing to participate gave informed consent, completed a questionnaire on sociodemographic details, knowledge and risk perceptions of TB and LTBI, and training and practice in infection control.[13] Participants were asked to record the number of TB patients seen each week.

At baseline, following HIV pre-test counselling, blood was collected for the HIV enzyme-linked immunosorbent assay and the IGRA (QuantiFERON®-TB Gold In-Tube, Celestis, Carnegie, VIC, Australia). A TST was placed by intradermal injection of two tuberculin units (0.1 ml) of purified protein derivative (RT23, Statens Serum Institut, Copenhagen, Denmark) on the left forearm after blood was drawn for IGRA. IGRA analyses were performed according to the manufacturer's instructions. Participants were asked to return after 48–72 h for TST reading and HIV post-test counselling. The IGRA was repeated at 6 and 12 months post-enrolment. At the 12-month visit, HIV counselling and testing was repeated for participants who were HIV-negative at enrolment, and another TST was placed. Two days later, at the final visit, TB exposure logs were collected, HIV test results communicated and the TST induration read.

Ethics statement

The study was approved by the Human Research Ethics Committee of the University of the Witwatersrand, Johannesburg, South Africa; the University of North Carolina at Chapel Hill Institutional Review Board, Chapel Hill, NC, USA; the Dean for Student Affairs, University of the Witwatersrand; and the Johannesburg Public Health Director, Johannesburg, South Africa. Participants with incident HIV infection, TB disease, IGRA or TST conversion were counselled and referred for appropriate care, including isoniazid prophylaxis.

Definitions and data analysis

TST results were classified as positive if the diameter of induration was >10 mm in HIV-negative participants and >5 mm in HIV-positive participants. The change in TST between baseline and month 12 was classified as persistently positive, persistently negative, conversion, reversion or missing (i.e., only baseline result available). IGRA results were classified as positive if $\geqslant 0.35$ international units (IU)/l and negative if <0.35 IU/l. Intra-individual changes in IGRA results over time within the range 0.32–0.38 IU/l were not interpreted as IGRA conversions or reversions. The change in IGRA results between the baseline and 6- and 12-month visits was classified as persistently positive (+/+/+ or +/missing/+), persistently negative (–/–/– or –/missing/–), stable conversion (–/–/+, –/+/+, missing/–/+, –/missing/+ or –/+/missing), stable reversion (+/–/–, +/+/–, +/missing/– or +/–/missing), unstable pattern (+/–/+ or –/+/–) or missing (baseline result available only). We compared the groups using the Pearson's χ^2 test and Student's *t*-tests for categorical and continuous variables. Incidence rate ratios (IRRs) were used to compare conversion rates between groups. The κ statistic was used to assess agreement between TST and IGRA results. Multivariable regression using forward selection was conducted using variables that were statistically significant on univariable analysis.

RESULTS

Cohort characteristics

Among 199 participants enrolled from January to July 2008, 79 were medical students and 120 were HCWs (88 nurses, 27 counsellors and 5 doctors). Characteristics at baseline and risk perceptions are described more fully elsewhere.[13] Compared to medical students, HCWs were more likely to be female (88.3% vs. 55.7%, $P < 0.001$) and younger (median age 36 vs. 22 years, $P < 0.001$). No medical students and 22 (11%) HCWs were HIV-positive at enrolment. Students had greater knowledge about TB than HCWs (median score 9 vs. 7, $P < 0.001$).

Among 153 (77%) participants who completed the questionnaire, 67 (44%) had received any training in TB infection control, 65 (42%) practised infection control and only 35 (23%) were able to list at least one appropriate infection control measure they adhered to routinely. While medical students were more likely to have received training in TB infection control (43/73 vs. 25/80, $P < 0.001$) and to report adherence to infection control measures (39/73 vs. 26/80, $P = 0.009$), they were not more likely than HCWs to provide an appropriate infection control measure (19/73 vs. 16/80, $P = 0.375$).

Among the 167 (84%) participants who completed the TB exposure log, the median number of TB cases encountered was 65 (interquartile range 34–98, range 0–160). Medical students reported half as many exposures as HCWs (42 vs. 90, $P < 0.0001$). At enrolment, 45% (95% confidence interval [CI] 38–53) were IGRA-positive and 48% (95%CI 42–57) were TST-positive (Figure). LTBI prevalence was two-

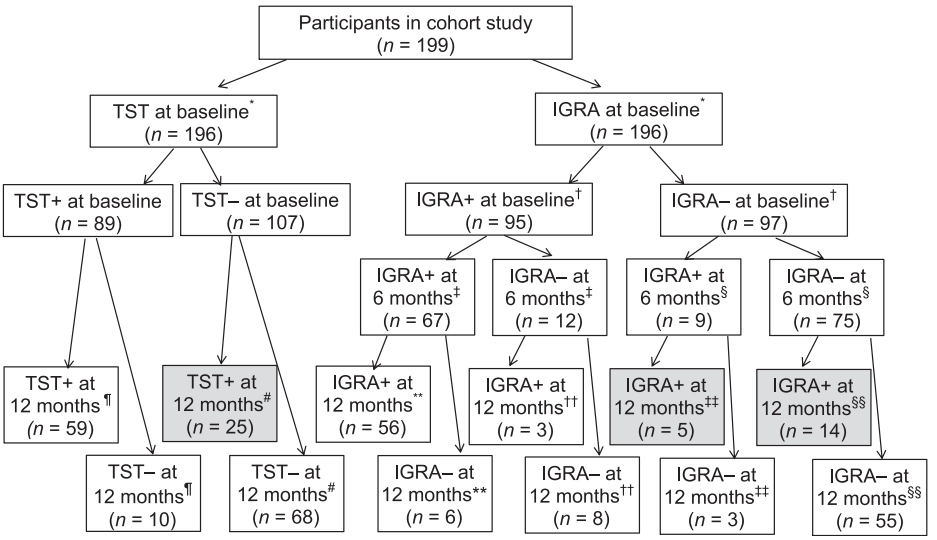

Figure Flow diagram for 199 study participants in a study to determine the incidence of LTBI among health care workers and medical students, Johannesburg, South Africa, 2007–2008. In the TST arm, 25 participants were identified as acquiring LTBI (grey box). In the IGRA arm, among those completing all visits, 19 participants were identified as having acquired incident LTBI, and among those for whom results were indeterminate or not available at one of the three time points (underlined below), six were identified as having acquired incident LTBI. * Baseline TST and IGRA each missing in 3 participants; † baseline IGRA indeterminate in 4 participants, of whom 2 were negative at 6 months and positive at 12 months and were subsequently classified as conversions; ‡ 6-month IGRA missing in 13 participants and indeterminate in 3; § 6-month IGRA not performed in 11 participants and indeterminate in 2; of these 13 participants, 3 were IGRA+ at month 12 and were classified as conversions; ¶ 12-month TST results missing in 20 participants; # 12-month TST results missing in 14 participants; ** 12-month IGRA missing in 5 participants; †† 12-month IGRA not performed in 1 participant; ‡‡ 12-month IGRA not performed in 1 participant, who was then classified as a 'conversion' (see definitions); §§ 12-month IGRA not performed in 5 participants and indeterminate in 1. TST = tuberculin skin test; IGRA = interferon-gamma release assay; + = positive; – = negative; LTBI = latent tuberculous infection.

to four-fold higher among HCWs than among medical students on TST and IGRA (56.7% vs. 26.6% for TST and 69.2% vs. 15.2% for IGRA).

Longitudinal tuberculin skin test and interferon-gamma release assay patterns

Incident LTBI was documented in 25/97 (26%) participants who were IGRA-negative at enrolment, giving an incidence rate of 29 per 100 person-years (py) (95%CI 20–44); 25/93 (27%) TST-negative participants at enrolment experienced incident LTBI, defined as TST conversion, giving an incidence rate of 29 cases/100 py (95%CI 19–42) (Table 1). Among the 66 participants negative on both TST and IGRA at enrolment, similar 12-month LTBI acquisition risks were documented using TST (13.6%, 95%CI 6.4–24.3) and IGRA (19.6%, 95%CI 10.9–31.3), but only 7.6% (95%CI 2.5–16.8) had documented conversion by both methods. Agreement between TST and IGRA conversions was poor (44.8% agreement, $\kappa = 0.23$), the dynamics of which are shown by the patterns of IGRA and TST responses over 12 months (Table 2). Among those participants with both TST and IGRA results available, 12/70 who were IGRA-positive at baseline experienced IGRA reversion, of whom 6 were persistently TST-positive, 5 persistently TST-negative and 1 experienced TST conversion (Table 2). Among the 29 HCWs with IGRA conversion, the majority (80%) had a $\geqslant$10-fold rise in IGRA titre between baseline and time of conversion (Table 3). Half of the participants (6/12, 50%) with IGRA reversion had a low baseline IGRA (<1 IU/ml). Ten patients with TST reversions were observed, of whom 6 were persistently IGRA-positive, 2 persistently IGRA-negative and 1 had an unstable IGRA pattern.

Risk factors for incident latent tuberculous infection

Compared to medical students, HCWs were 4.6 times more likely to experience IGRA conversion (IRR 4.6, 95%CI 1.8–13.0), but were not more likely to experience TST conversion (IRR 1.4, 95%CI 0.5–3.3) (Table 1). Female sex, older age and greater exposure to TB were also associated with greater risk of IGRA but not TST conversion. Among the 167 (84%) participants who completed the weekly exposure log, those with IGRA conversion had a higher caseload than those who were persistently

Table 1 Test conversion, LTBI incidence and IRR as measured using the QuantiFERON® Gold In-Tube assay and TST among medical students and HCWs

		Negative baseline test		Conversion		LTBI incidence				Crude IRR			
		IGRA	TST*	IGRA	TST	IGRA		TST		IGRA		TST	
	n	*n*	*n*	*n*	*n*	py	Incidence/100 py (95%CI)	py	Incidence/100 py (95%CI)	IRR (95%CI)	*P* value	IRR (95%CI)	*P* value
Entire cohort	199	97	93	25	25	84	29 (20–44)	87	29 (19–42)	–		–	
Sex													
Female	150	69	80	22	20	60	37 (24–56)	67	30 (19–46)	Reference		Reference	
Male	47	28	24	3	5	24	12 (4–38)	20	5 (10–59)	0.35 (0.7–1.2)	0.032	0.8 (0.2–2.3)	0.365
Occupation													
Medical student	79	62	56	7	10	54	13 (6–27)	45	23 (12–43)	Reference		Reference	
HCW	120	35	51	18	15	30	56 (36–91)	41	34 (21–57)	4.32 (1.7–12.2)	<0.001	1.5 (0.6–3.7)	0.166
HIV status													
Non-HIV-infected	177	91	92	23	22	78	29 (19–44)	74	30 (20–45)	Reference		Reference	
HIV-infected	22	6	15	2	3	5	40 (10–163)	13	23 (7–70)	1.4 (0.2–5.7)	0.310	0.8 (0.1–2.5)	0.347
Age category, years													
<31	114	70	70	12	15	60	20 (11–35)	54	28 (17–46)	Reference		Reference	
⩾31	76	22	33	10	10	22	46 (25–86)	31	33 (18–61)	2.3 (0.9–5.8)	0.031	1.2 (0.5–2.8)	0.340
TB exposure†													
Low (<74/year)	94	59	57	10	10	52	19 (10–36)	46	22 (12–41)	Reference		Reference	
High (⩾74/year)	73	22	32	14	11	22	62 (36–106)	32	34 /(19–63)	3.3 (1.3–8.2)	0.002	1.6 (0.6–4.2)	0.149
TB knowledge score, %‡													
<55	61	24	26	8	4	19	41 (21–82)	20	20 (7–53)	Reference		Reference	
⩾55	92	59	59	9	13	57	17 (9–33)	48	27 (16–47)	0.4 (0.1–1.3)	0.043	1.4 (0.42–5.8)	0.298
TB infection control training‡													
No	86	41	45	12	12	34	35 (20–61)	35	34 (19–60)	Reference		Reference	
Yes	67	42	40	5	5	37	14 (6–33)	32	15 (6–37)	0.4 (0.1–1.2)	0.036	0.5 (0.1–1.4)	0.068
TB infection control practised by participant‡													
No	88	45	50	12	13	39	31 (18–55)	38	34 (20–59)	Reference		Reference	
Yes	65	38	35	5	4	33	15 (6–37)	30	14 (5–36)	0.5 (0.1–1.5)	0.091	0.4 (0.1–1.3)	0.050
TB infection control practice‡													
Incorrect	118	64	69	15	15	55	27 (16–45)	53	28 (17–47)	Reference		Reference	
Correct	35	19	16	2	2	16	12 (3–50)	14	14 (3–55)	0.5 (0.1–2.0)	0.152	0.5 (0.1–2.1)	0.180

* Negative TST defined as <10 mm in HIV-negative persons and <5 mm in HIV-positive persons.
† 32 participants did not complete the TB exposure log.
‡ 46 participants did not complete the baseline TB knowledge assessment.
LTBI = latent tuberculous infection; IRR = incidence rate ratio; TST = tuberculin skin test; HCW = health care worker; IGRA = interferon-gamma release assay; py = person-years; CI = confidence interval; HIV = human immunodeficiency virus; TB = tuberculosis.

Table 2 Agreement between QFN-GIT assay (IGRA) and TST among 161/199 South African health care workers and medical students with baseline IGRA and TST results who had an IGRA and TST reading on at least one other occasion during the 12-month follow-up period

		TST			
IGRA*	*n* (column %)	Persistently positive	Persistently negative	Stable conversion	Stable reversion
Persistently positive	58 (36)	34†	7‡	11§	6§
Persistently negative	62 (39)	10‡	43†	7§	2§
Stable conversion	24 (15)	8§	10§	5†	1‡
Stable reversion	12 (7)	6§	5§	1‡	0†
Unstable	5 (3)	1	2	1	1
Total (row %)	161 (100)	59 (37)	67 (42)	25 (16)	10 (6)

* QFN-GIT response pattern: persistently positive (+/+/+ or +/missing/+), persistently negative (–/–/– or –/missing/–), stable conversion (–/–/+ or –/+/+ or –/missing/+ or –/+/missing), stable (+/–/– or +/+/– or +/missing/– or +/–/missing) and unstable (+/–/+ or –/+/–). For three participants, IGRA status over time was revised from stable reversion (2 participants) or unstable (1 participant) to 'persistently negative' because some of their IGRA results fell within the range 0.32–0.38 IU/l IGRA. The QFN-GIT readings for these patients at enrolment and at 6 and 12 months in IU/ml were as follows: patient 1: 0.38, 0.39, 0.04 (revised as persistently negative); patient 2: 0.35, 0.25, 0.25 (revised as persistently negative); patient 3: readings were 0.11, 0.35, 0.2 (revised as persistently negative). Agreement for conversion = 44.8%; $\kappa = 0.23$.
† Concordance.
‡ Discordance.
§ Conversion/reversion by one test method and a stable reading on the other test method.
QFN-GIT = QuantiFERON® Gold In-Tube; IGRA = interferon-gamma release assay; TST = tuberculin skin test; IU = international unit.

IGRA-negative (mean number of TB case exposures: 81 cases, 95%CI 61–102 vs. 50 cases 95%CI 43–57, $P < 0.001$). Those who experienced TST conversion were exposed to more TB patients/suspects than those who were persistently TST-negative (mean 89, 95%CI 62–117 vs. 65, 95%CI 55–74, $P = 0.01$).

Greater knowledge about TB and LTBI, participation in infection control training and infection control practice were all associated with a 50–60% reduction in risk of LTBI acquisition, independently of whether this was defined as TST or IGRA conversion, but not all associations reached statistical significance. In univariable analysis, age, sex, cohort and the number of TB patients to whom participants were exposed were significantly associated with IGRA conversion, while only cohort and the number of TB patients were associated with TST conversion. In a multivariable model for IGRA conversion adjusted for age, sex and TB patient caseload, only HCW or medical student status remained significantly associated with LTBI acquisition (odds ratio 7.7, 95%CI 1.6–36.9). None of the factors assessed were independently associated with TST conversion.

Incident tuberculosis disease and human immunodeficiency virus infection

Incident HIV infection was documented in two nurses, corresponding to an HIV incidence rate of 2.1/100 py (95%CI 0.5–8.7) among HCWs. Two participants were diagnosed with TB during follow-up, corresponding to a TB incidence rate of 1.8/100 py (95%CI 0.45–7.2) among HCWs. An asymptomatic HCW whose TST ulcerated at enrolment was started on anti-tuberculosis treatment by her attending physician despite a normal chest X-ray. A second HCW who was IGRA-positive and TST-negative at baseline was diagnosed with TB of the knee joint 11 months after enrolment. In this participant, TST induration increased from 5 mm at baseline to 29 mm at month 12.

DISCUSSION

In this prospective study, we observed high LTBI incidence among South African HCWs and medical students providing HIV and TB care. Among HCWs, the incidence was almost twice as high when defined

Table 3 Change in 0.5 log category of QFN-GIT assay (IGRA) reading in IU/ml at baseline and month 12 among 183 health care workers with evaluable results over 12 months, Johannesburg, South Africa, 2008–2009*

Baseline IGRA category as determined by reading in IU/ml	Participants	IGRA category as determined by reading in IU/ml at month 12 *n* (%) of baseline cohort				
n	*n*	<0.35	0.35–1	>1–3.4	>3.5–10	>10
<0.35	96	72 (75)	4 (4)†	3 (3)†	5 (5)†	12 (13)†
0.35–1	14	9 (64)	0	0	0	5 (36)
>1–3.4	23	5 (20)	5 (20)	3 (12)	3 (12)	9 (36)
>3.5–10	26	6 (25)	0	3 (13	4 (17)	11 (46)
>10	24	1 (4)	0	1 (4)	2 (8)	20 (83)
	183	93 (51)	9 (5)	6 (3)	18 (10)	57 (31)

* Based on QFN-GIT assay output in IU/l, and not on the test interpretation as provided by proprietary software.
† These 24 participants represent those participants who developed incident LTBI. An additional participant did not have a baseline IGRA result and hence is not represented in this table, but was deemed to have developed LTBI based on a 6-month IGRA <0.35 and a 12-month IGRA >10 IU/ml.
QFN-GIT = QuantiFERON® Gold In-Tube; IGRA = interferon-gamma release assay; IU = international unit; LTBI = latent tuberculous infection.

as IGRA conversion (56/100 py, 95%CI 39–91) as when defined as TST conversion (34/100 py, 95%CI 21–57). The LTBI incidence rate in this highly exposed population of HCWs was substantially higher than the 8.4% (95%CI 2.7–14) annual risk of TST conversion reported in a meta-analysis of five studies of HCWs in high TB burden countries.[14]

While LTBI incidence among medical students was lower, it was still high in absolute numbers, with an incidence rate of 13/100 py (95%CI 6–27) on IGRA and of 23/100 py (95%CI 12–43) on TST. The observed rate is similar to the 19.3/100 py (95%CI 14.2–26.2) TST conversion rate observed among nursing students in Harare, Zimbabwe.[15] The fact that cohort (HCW or medical student) was the only factor independently associated with IGRA conversion most likely points to the different clinical responsibilities and type of patient interactions experienced by HCWs compared to medical students.

TB knowledge and TB infection control training and practice were associated with a 50–60% reduction in risk of LTBI acquisition. This is in keeping with observations that TB infection control measures reduce nosocomial transmission. In Brazil, HCWs working in hospitals that did not practise TB infection control were at greater risk of incident LTBI,[16] and use of N95 respirators was associated with a lower risk of incident LTBI.[17] In Thailand, the rate of incident LTBI among HCWs decreased after the implementation of TB infection control measures.[18] Although the South African Departments of Health and Public Service Administration recommend the implementation of TB infection control measures in health care facilities,[12,19] the measures remain poorly implemented.[4,20,21] Lack of resources, lack of faith in the efficacy of infection control measures and a focus on individual-level personal protection, particularly N95 respirators, are reasons for the failure to fully implement and support TB infection control measures in South African health facilities.[22]

The high LTBI incidence rate observed in this study, the high risk of active TB observed in other studies of South African HCWs[4–6] and the fact that 81% of TB cases among HCWs are estimated to be due to occupational TB exposure,[14] all highlight the need for occupational TB screening programmes, especially among highly exposed HCWs. Incoming medical and nursing students are a vulnerable population, and annual TB screening programmes should be developed, similar to programmes routinely implemented for medical students in low TB burden settings. Studies have shown that South African HCWs are in principle supportive of occupational programmes aimed at preventing nosocomial TB transmission, but stigma of TB and HIV, fear of failure to maintain confidentiality and lack of awareness about HIV status pose barriers to successful occupational screening programmes.[23,24] Other obstacles include lack of training, inadequate documentation, lack of guidance as to what services should be provided and how to implement them, and poor understanding of HCW rights.[24,25]

While the need for annual screening programmes is self-evident, whether IGRA or TST should be used remains open to debate. Data on IGRA and TST performance for serial testing of HCWs in high TB burden settings are scarce. Based on the observation of highly dynamic IGRA responses over time in Indian nurses, with 20–25% of positive IGRAs spontaneously reverting due to clearing of *Mycobacterium tuberculosis* infection, transient immunological reaction or lack of reproducibility of the assay, and given a lack of association with TB exposure in this population, Zwerling and Pai concluded that IGRAs may not be the ideal diagnostic test for repeated screening of medical and nursing students,[26,27] and that treating all IGRA-positive HCWs could result in unnecessary adverse events and costs. Our results do not support this conclusion. In contrast, we observed few unstable IGRA patterns over time (3%) and low IGRA reversion rates (7%). Furthermore, we observed a similar rate of TST reversion (7%). Most reversions in our cohort occurred in individuals with a baseline IGRA <1 IU/ml, and most conversions were based on a $\geqslant 10$-fold increase from baseline, supporting the call for a revision of IGRA interpretation.[28,29] The contradictions between the findings among Indian and South African HCWs, and the poor agreement between IGRA and TST, suggest an inadequate understanding of what IGRA and TST measure, and preclude selection of one test over the other for occupational monitoring of HCWs. It may therefore be prudent to offer isoniazid prophylaxis to HCWs with conversion either by TST or IGRA.[30,31]

In conclusion, our findings add urgency to the call for improved adherence to guidelines for TB infection prevention and control[12,32] and the implementation of occupational TB screening programmes for HCWs[19] in health care facilities in high TB burden countries.

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RESUME

CONTEXTE : En Afrique du Sud, le personnel de santé (HCW) court un risque deux fois plus élevé de contracter la tuberculose (TB) par rapport à la population générale. Peu d'études ont évalué ce risque d'infection tuberculeuse.
OBJECTIF : Déterminer l'incidence et les facteurs de risque d'infection tuberculeuse latente (LTBI) dans les HCW et comparer les résultats du test de libération de l'interféron gamma (IGRA) avec ceux du test cutané à la tuberculine (TST).
SCHÉMA : Les HCW, y compris les étudiants en médecine, ont subi un TST, un test pour le virus de l'immunodéficience humaine et un test IGRA au départ, à 12 mois et pour l'IGRA également à 6 mois. Les participants ont tenu un registre d'exposition à la TB pendant 12 mois.
RÉSULTATS : Parmi 199 participants, 150 (76%) étaient des femmes ; l'âge médian était de 31 ans (fourchette 20–61) ; la survenue de LTBI a été documentée par l'IGRA chez 25/97 (26%), soit une incidence de 29 cas/100 personnes-années (py) (IC95% 20–44) et par TST chez 25/93 (27%), soit une incidence de 29 cas/100 py (IC95% 19–42). La concordance entre le TST et l'IGRA a été médiocre (44,8%, $\kappa = 0{,}23$). Une exposition annuelle à la TB plus élevée a été rapportée parmi les personnes atteintes de LTBI par rapport à celles dont l'IGRA restait négatif : 81 cas (IC95% 61–102) contre 50 cas (IC95% 43–57 ; $P < 0{,}01$).
CONCLUSIONS : L'incidence élevée de LTBI dans les HCW et l'association de la survenue de LTBI avec la charge de travail annuelle liée à la TB montre que des mesures plus efficaces de lutte contre l'infection par la TB doivent être mises en œuvre dans les structures de santé d'Afrique du Sud.

RESUMEN

MARCO DE REFERENCIA: En Suráfrica, los profesionales de salud (HCW) presentan un riesgo de contraer la enfermedad tuberculosa que es dos veces mayor que el riesgo de la población general. Pocos estudios han evaluado el riesgo de adquirir la infección tuberculosa.
OBJETIVO: Determinar la incidencia y los factores de riesgo de contraer la infección tuberculosa latente (LTBI) por parte de los HCW y comparar los resultados de la prueba de liberación de interferón gama (IGRA) y la reacción cutánea a la tuberculina (TST).
MÉTODOS: Se practicó la reacción TST, la IGRA y la serología frente al virus de la inmunodeficiencia humana a HCW, incluidos estudiantes en medicina, al comienzo de la investigación y 12 meses después; la IGRA se repitió a los 6 meses. Los participantes llevaron un registro de su exposición a la tuberculosis (TB) durante 12 meses.
RESULTADOS: Participaron en el estudio 199 personas, de las cuales 150 de sexo femenino (76%); la mediana de la edad fue 31 años (entre 20 y 61); se documentó la aparición de LTBI en 25 de 97 participantes mediante la IGRA (26%), con una tasa de incidencia de 29 casos por 100 años-persona (py) (IC95% 20–44); la TST detectó 25 casos en 93 participantes (27%), con una tasa de incidencia de 29 casos/100 py (IC95% 19–42). La concordancia de ambas pruebas fue baja (44,8%; $\kappa = 0{,}23$). Se observó una tasa más alta de exposición a casos de TB en las personas con LTBI que en las personas con un resultado negativo persistente en la IGRA (81 casos, IC95% 61–102 contra 50 casos, IC95% 43–57; $P < 0{,}01$).
CONCLUSIÓN: La alta incidencia de LTBI y la asociación de casos nuevos de LTBI con la carga anual de morbilidad por TB en los HCW reflejan la necesidad de instaurar medidas más eficaces de control de la infección tuberculosa en los establecimientos de salud de Suráfrica.